Posttraumatic Stress, Anxiety, and Depression in Survivors of Severe Acute Respiratory Syndrome (SARS)

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This study examines the psychological impact of severe acute respiratory syndrome (SARS) in 195 adult patients in Hong Kong. The Impact of Event Scale—Revised and Hospital Anxiety and Depression Scale were administered to patients 1 month after their discharge. Of the participants 10% to 18% reported symptoms related to posttraumatic stress disorder, anxiety, and depression. Symptom severity was associated with high perceived life threat and low emotional support. Women and participants who had low education level were more likely to have symptoms of avoidance. Participants who personally knew someone who had SARS were more likely to be affected by depressive symptoms.

Severe acute respiratory syndrome (SARS), a previously unknown coronavirus, infected 8,000 people and claimed more than 900 lives worldwide in just a few months (World Health Organization, 2003). The confrontation with the diagnosis of SARS, the experience of physical impairment and treatments, and the witnessing of events in the ward, such as emergency resuscitation procedures and death, all constituted a uniquely terrifying experience for SARS patients.

According to previous studies, the onset of a sudden and immediately life-threatening illness could lead to posttraumatic stress disorder (PTSD). The prevalence rates of PTSD in medical studies have varied from 1% to 5% for childbirth, from 14% to 59% for a life-threatening situation in an intensive care unit (ICU), and from 0% to 60% for cancer. The incidence found across studies varied according to the inclusion of subclinical PTSD and the types and stages of the disease studied (Kangas, Henry, & Bryant, 2002; Tedstone & Tarrier, 2003).

The Impact of Event Scale (IES) and Hospital and Anxiety Scale (HADS) were frequently used self-report measures in previous studies on the relationship between medical illness and PTSD (Tedstone & Tarrier, 2003). In these studies, the predictor variables identified in the development of PTSD included aspects of the trauma itself, emotional support, and the invasiveness of the medical intervention. In PTSD literature for a broader range of traumas, other predictor variables such as gender, age, and perceived life threat were found (Brewin, Andrews, & Valentine, 2000).

This study examined the occurrence rate and associated risk factors for PTSD, anxiety, and depression among SARS survivors. The risk factors examined include demographic variables, parameters for disease severity, and SARS-related psychosocial variables.

Method

Participants

All confirmed SARS patients who survived and who were later discharged from the Caritas Medical Centre,

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Kwong Wah Hospital, or Wong Tai Sin Hospital during the period from March to August 2003 were recruited in the study. The assessment materials were posted to 476 SARS survivors 1 month after they were discharged from the hospital. There were 195 (41%) participants who returned the completed questionnaires. Respondents in the present study ($M = 41.52$; $SD = 13.98$) were younger than the nonrespondents ($M = 45.49$; $SD = 18.57$), F (1, 474) $= 6.36$, $p < .05$. No significant difference was found between respondents and nonrespondents in gender and duration of hospitalization for the treatment of SARS.

Demographic Variables

Among the participants, 84 were men and 111 were women. Their ages ranged from 18 to 88. There were 46 (24%) participants who had received primary (i.e., Grade 6) or below primary education; 97 (50%) had received secondary education; 52 (26%) had received postsecondary education. Regarding family income, 64 (33%) earned HKD10,000 or below; 67 (34%) earned HKD10,000 to HKD20,000; 64 (33%) earned HKD20,001 or above.

Parameters for Severity of Disease

The duration of patients' hospitalization for the treatment of SARS varied from 12 to 108 days ($M = 28.71$; $SD = 13.78$). There were 24 (12%) participants who required treatment in the ICU.

SARS-Related Psychological and Social Variables

For the rating of perceived life threat on a 5-point scale, 19 participants (10%) reported *not at all*, 57 (29%) reported *a little*, 56 (29%) reported *moderately*, 48 (24%) reported *quite serious*, and 15 (8%) reported *extremely serious*. Eighty-six participants (44%) personally knew someone who had SARS. Nineteen (10%) knew someone who had died of SARS. Regarding the number of people with whom they could talk and share their worries on a 4-point scale, 13 participants (6%) indicated *no one*, 103 (53%) indicated *one to two*, 58 (30%) indicated *three to four*, and 21 (11%) indicated *five or above*.

Measures

Impact of Event Scale—Revised

The Impact of Event Scale—Revised (IES-R) (Weiss & Marmar, 1997) is a self-report measure for capturing the level of symptomatic responses to a specific traumatic stressor in the past week. The degree of distress for each item is rated on a 5-point scale, ranging from the absence of a symptom (score of 0) to maximal symptoms (score of 4). There are three subscales (i.e., Intrusion, Avoidance, and Hyperarousal). Subscale scores were equal to the mean score of the nonmissing items for the specific subscale.

The IES-R subscales have demonstrated high internal consistency, with Cronbach's alpha ranging from .79 to .91, and test–retest reliability alpha ranging from .51 to .94 (Weiss & Marmar, 1997). The Chinese version of the IES-R was found to have good internal consistency and favorable scale equivalence when compared with the original English version (Wu & Chan, 2003). A mean score of 2 on a specific subscale was indicated as the appropriate cutoff. The internal reliability alpha for the Avoidance, Hyperarousal, and Intrusion subscales for the present sample was .84, .85, and .88, respectively.

Hospital Anxiety and Depression Scale (HADS)

The HADS (Zigmond & Snaith, 1983) is a self-report instrument designed to detect symptoms related to anxiety and depression in the general medical outpatient population in the past week. All items are rated on a 4-point scale, ranging from the absence of a symptom (score of 0) to maximal symptoms (score of 3). Leung, Ho, Kan, Hung, and Chen (1993) found that the Chinese version of the HADS had good internal consistency and favorable scale equivalence when compared with the original English version. A score of 11 was used as the cutoff for all HADS subscales. The internal reliability alpha for the Depression and Anxiety subscales for the present sample was .84 and .87, respectively.

Survey Questionnaire

A survey questionnaire was used to collect information on the demographic and SARS-related psychosocial variables.

Statistical Analyses

The percentage of participants who met the cutoffs for outcome measures (i.e., the IES-R and HADS subscale scores) was examined. Multivariate analysis of variance (MANOVA) was used to investigate the effect of discrete

predictor variables on the outcome measures. Pearson correlations and multiple regressions were used to examine the relationship between continuous predictor variables and outcome measures.

Results

Symptoms Related to Posttraumatic Stress Disorder, Anxiety, and Depression

The means and standard deviations for the IES-R and HADS subscales were examined. The subscales were Intrusion ($M = 1.11$; $SD = .72$), Avoidance ($M = .93$; $SD = .69$), Hyperarousal ($M = 1.04$; $SD = .80$), Anxiety ($M = 5.95$; $SD = 4.12$), and Depression ($M = 6.01$; $SD = 4.47$).

Twenty-four participants (12%) met the cutoff for the Intrusion subscale; 20 (10%) met the cutoff for the Avoidance subscale; 29 (15%) met the cutoff for the Hyperarousal subscale. As PTSD is characterized by the presence of all three domains of distressful features, the percentage of participants who met the cutoff for all three subscales was examined. Eleven participants (6%) met the cutoffs for all three IES-R subscales.

With reference to HADS, 28 participants (14%) met the cutoff for the Anxiety subscale; 35 participants (18%) met the cutoff for the Depression subscale.

Predictors of Posttraumatic Stress Symptoms and Emotional Distress

The IES-R and HADS subscale scores were the dependent variables in the present examination. Results of the MANOVA indicated significant differences in the combined dependent variables by gender, Wilks' = .93, $F(5, 189) = 2.93$, $p < .05$, ES = .07, and by whether or not participants knew or did not know someone who had SARS, Wilks' = .92, $F(5, 189) = 3.28$, $p < .01$, ES = .08. Results of univariate F tests found that the IES-R Avoidance subscale score for women ($M = 1.04$; $SD = .73$) was significantly higher than that for men ($M = .78$; $SD = .60$), $F(1, 193) = 6.57$, $p < .05$, ES = .03. The HADS Depression score for participants who knew someone who had SARS ($M = 6.86$; $SD = 4.56$) was significantly higher than that for those who did not ($M = 5.33$; $SD = 4.31$), $F(1, 193) = 5.67$, $p < .05$, ES = .03.

The results of the Pearson correlations indicated that education level was significantly related to the IES-R Avoidance score ($r = -0.18$, $p < .05$), but relationships with other IES-R and HADS scores were not significant. The rating of perceived life threat and the number of people with whom participants reported they could talk and share their worries were significantly related to various IES-R and HADS subscale scores. Results suggested that the higher the perceived life threat, the greater the symptom severity. On the other hand, the more people one could talk to and share worries with, the less the symptom severity. The correlation coefficients are presented in Table 1. No other significant group differences or correlations were identified for other predictor variables.

To determine which variables had the greatest impact on the outcome measures, standard multiple regressions were conducted by using the IES-R and HADS subscale scores as the criterion variables. The rating on perceived life threat and the number of people with whom participants reported they could talk and share their worries were entered into the regression model as predictor variables. Overall, the amount of total variance accounted for in individual IES-R and HADS subscale scores by these variables was significant. The semipartial correlations (sr^2) in Table 1 show that both variables were significant predictors for IES-R and HADS scores. The impact of perceived life threat was greater than that of emotional support on various IES-R measures and the HADS Anxiety score. Table 1 summarizes the results of the multiple regression analyses.

Discussion

This study provides empirical data on traumatic stress in relation to SARS. In an ongoing study that used IES-R as the assessment instrument, the percentage of 74 hospitalized traffic accident victims who met the cutoff for all the IES-R subscales (11%) was not significantly different from that for SARS patients. However, they had higher Intrusion ($M = 1.34$; $SD = .91$) and Avoidance ($M = 1.19$; $SD = .89$) scores than SARS patients ($p < .05$) (Wu, Cheung, & Chan, 2005).

Perceived life threat emerged as the most significant predictor for the IES-R and HADS scores that reflect anxiety-based symptoms. Perceived emotional support was the best predictor of the HADS score that reflects depression. Gender and education level were found to be significantly associated with the avoidance symptoms. Knowing someone who had SARS was significantly associated with the measure related to depression. Although further exploration into the association would be needed, these findings suggest that there may be specific risk factors for specific symptoms.

There are limitations of the present study that should be addressed. As Criterion A of PTSD was not specifically assessed in the present study, the occurrence rate of

Table 1. Summary of Multiple Regression Analyses for Variables Predicting Impact of Event Scale—Revised and Hospital Anxiety and Depression Scale Subscale Scores ($N = 195$)

Dependent Variable Predictor Variable	B	$SE (B)$	β	sr^2	r	R^2	Overall F (2, 192)
IES-R Intrusion						.14	16.17***
Perceived life threat	.21	.04	.33	.11***	.33***		
Emotional support	−.17	.06	−.18	.03**	−.19**		
IES-R Avoidance						.10	10.78***
Perceived life threat	.17	.04	.27	.07***	.28***		
Emotional support	−.13	.06	−.15	.02*	−.16*		
IES-R Hyperarousal						.14	15.56***
Perceived life threat	.23	.05	.32	.10***	.32***		
Emotional support	−.19	.07	−.18	.03**	−.20**		
HADS Anxiety						.15	17.51***
Perceived life threat	1.29	.25	.35	.12***	.36***		
Emotional support	−.89	.35	−.17	.02*	−.18*		
HADS Depression						.11	11.64***
Perceived life threat	.65	.27	.16	.02*	.17*		
Emotional support	−1.61	.39	−.28	.07***	−.28***		

Note. IES-R = Impact of Event Scale—Revised; HADS = Hospital Anxiety and Depression Scale; Perceived life threat = rating on perceived life threat; emotional support = number of people with whom they could talk and share worries reported by participants.
*$p < .05$. **$p < .01$. ***$p < .001$.

PTSD symptoms could not be assumed as a prevalence estimate in a straightforward manner. Such findings would be further substantiated by the administration of clinical interviews for PTSD to differentiate it from other diagnoses such as adjustment disorder. Because the response rate for the study was less than 50% and respondents were younger than nonrespondents, the present findings may not be readily generalized for all SARS survivors. The small number of participants for certain predictor variables might have limited the power for finding significant relationships between variables.

Conclusion

SARS survivors may experience features of PTSD, anxiety, and depression. The significant predictors found in the present study may help to identify the at-risk survivors for timely intervention.

Acknowledgments

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